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January 25, 1996

William Caton, Secretary
Federal Communications Commission
1919 M. Street, N.W., Room 222
Washington, D.C. 20554

RE: EX PARTE STATEMENT; C.C. DOCKET NO. 94-1

Dear Mr. Secretary:

While investigating regulatory issues in another venue, I recently became aware of supporting material included as Appendix F to the FCC C.C. Docket No. 94-1, First Report and Order, Released April 7, 1995. This appendix was an analysis of "Input Prices and Total Factor Productivity", by C. Anthony Bush and Mark Uretsky of the FCC staff. My review of the material yielded contrasting results which may be useful to the Commission and other parties to this docket. A summary of that analysis is attached as "A Review of LEC Input Price Changes".

If there are any other questions, you may reach my Colorado Springs office at (719) 260-6055. Thank you for your consideration.

Sincerely,

Jerry Langin-Hooper, Ph.D.

EX PARTE STATEMENT

C.C. DOCKET NO. 94-1

A REVIEW OF LEC INPUT PRICE CHANGES

AN ALTERNATIVE EXAMINATION OF DATA CONTAINED IN APPENDIX F, FIRST REPORT AND ORDER, FCC C.C. DOCKET 94-1

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A REVIEW OF LEC INPUT PRICE CHANGES

AN ALTERNATIVE EXAMINATION OF DATA CONTAINED IN APPENDIX F, FIRST REPORT AND ORDER, FCC C.C. DOCKET 94-1

The telecommunications industry has struggled with a number of very important policy issues over the past couple of decades. The introduction of competition in the long distance market, establishment of equal access, implementation and ongoing review of access charges, and creation of price cap procedures have been among the most pivotal. Many of these issues have been evaluated with econometric analysis of industry data.

The FCC's examination of historical productivity gains in the LEC Price Cap Performance proceeding is a recent example of econometric estimation contributing to policy determination. In particular, two economists on the FCC's staff prepared a report entitled "Input Prices and Total Factor Productivity".[1] As Mssrs. Bush and Uretsky describe, a point of some contention in the proceeding was the magnitude of the effect of including input price changes in the productivity offset. USTA argued for long-run differences between LEC input prices and the U.S. economy while Ad Hoc argued that only the post-divestiture period was relevant. The authors conclusion supported the use of data from only the post-divestiture period.[2]

Bush and Uretsky address several points including a derivation of the basis for productivity offsets, the sources of the data used for their estimation, the potential effects of measurement errors in the price data, and the differences in short-run versus long-run measurement of the input price differential. This review addresses

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[1] Appendix F, FCC C.C. Docket No. 94-1, First Report and Order, Released April 7, 1995, by C. Anthony Bush and Mark Uretsky.

[2] As an historical footnote, the original Price Cap Order used a productivity offset which was an average of long-term industry productivity of about 2% and an "access regime" (which coincides with the post-divestiture period) value of about 4%. In the Price Cap Review, eliminating the inclusion of pre-divestiture industry experience probably increased the productivity offset by about a full percentage point.

only the last of three items associated with the short-run versus long-run differential, in which the authors present results of statistical tests to support their use of the short-run data series. In those tests, Bush & Uretsky regressed the LEC industry input price change series (from the USTA submission) against 1) Moody's rate on utility bonds, 2) the rate of change in overall U.S. input prices, and 3) a divestiture dummy variable. The resulting r^2 was .44 with significant t-statistics for Moody's and divestiture.[3] A large drop in telecommunications input price growth in the mid to late eighties was a notable characteristic of the data.[4] Bush & Uretsky allowed for that experience by including the U.S. input price change series as an explanatory variable in the analysis, although their estimated coefficient on general input inflation was positive but insignificant. From the analysis, Bush and Uretsky concluded that divestiture signalled a significant break from prior industry experience.

Unfortunately, the analysis was fundamentally flawed. Their model represented **changes** in input prices (the dependent variable) as a function of interest rate **levels**.

The change in a variable's level is almost always different from the magnitude of the level itself. For instance, a negative change (-1%) from a high level of the rate (such as 12%) and a positive change (as +1%) from a low level (5%) demonstrate the distinct difference between levels and changes in levels. The use of a level variable instead of its rate of change can create critical differences in estimation. Such is the case in this instance.

For a capital-intensive industry such as telecommunications, interests rates do play a significant role in determining costs (and thereby subsequent prices) for both wholesale (LEC input) suppliers and retail (the LECs' own) offerings. In separate analyses, Langin-Hooper Associates has discovered and quantified an apparent business-cycle pattern to productivity growth in telecommunications; that pattern appears to be directly related to

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[3] That analysis is replicated on the attached chart, Figure 1.

[4] That drop should be no surprise to anyone who remembers the late seventies and early eighties as the most intensely inflationary period since World War II. Price levels began rising rapidly in the late sixties and continued throughout the seventies. As overall inflation began to dissipate in the early eighties, it was no surprise that telecommunications input price increases would experience similar softening.

inflation and interest rates.[5] Thus, the better approach to the estimation would have been to regress **changes** in LEC input prices against **changes** in interest rates (just as they were evaluated with respect to **changes** in overall input price levels).

The second attachment to this review -- Figure 2 -- shows the results of such a re-analysis. A new variable was created to quantify the change in interest rates. The variable was the annualized difference in the average interest rates of the prior two years relative to the average rate of the third and fourth prior years using the Moody's data reported by Bush and Uretsky.[6] This variable quantifies the changes in the cost of capital in a way likely to be mirrored in the resulting change in price for goods produced with that capital. The estimated r^2 was .56 for a regression of LEC industry input price changes against 1) changes in interest rates, 2) changes in overall U.S. input prices, and 3) a divestiture dummy variable. The change in interest rates was shown to be quite significant (with a t-statistic of 3.9) as was the change in U.S. input prices (resulting t-statistic of 2.9).[7]

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[5] The observed pattern shows telecommunication productivity to grow more quickly during and immediately after expansionary periods (often associated with inflation) and grow less quickly during and immediately after contractions (such as recessions). For instance, telecommunications productivity growth was abysmal during the Great Depression. It appears that telecommunications costs are strongly associated with the costs of capital in the recent past; those costs are due to input prices for capital goods and interest rates for financing the capital development. During inflationary periods, the current capital costs reflect the relatively lower prices and rates of the previous years. However, at the end of that cycle, the recent higher prices and interest rates cause subsequent capital costs to rise substantially, crushing productivity growth.

[6] This variable effectively represents the annualized change in interest rates between a period of 3 1/2 years prior to 1 1/2 years prior to the time point of the input costs. The lag reflects the reality that capital costs change somewhat slower than other costs; for instance, costs incurred for capital expansion are often not fully booked until the completion of construction. In any case, the timing of the interest rate change does not appear to be especially critical. Other measures, such as the difference between the prior two years and between the current and various prior years were examined. In general, the effects were comparable to those described for this variable.

[7] Both interest rates and U.S. input prices offered considerably more explanatory power (t-statistics of 3.9 and 2.9) in the revised estimation than they did in Bush and Uretsky

The key difference in results, however, was that the coefficient for divestiture was now positive (.003) and quite insignificant (t-statistic of .2). The interest rate transformation put the explanatory data on an even par with the LEC input price data, and yielded quite contrasting results to the original study. Divestiture seems not to have been the cause of lower input prices for telecommunications in the eighties; indeed, it appears that the joint effects of lower interest rates (for a capital intensive industry) and lower overall input prices were the more likely causes.

Contrary to the authors' conclusion, the revised analysis shows that the post-divestiture period does not represent a significant break from the past. Given the remarkable duration of the economic expansion between the early eighties and the early nineties, an almost opposite conclusion may be necessary. Since the immediate post-divestiture period covers only the expansionary part of the business cycle, use of data from only that period may be inappropriate and long-run data spanning several business cycles may be superior in establishing a basis for anticipated future productivity growth.

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original approach (2.5 and 1.0, respectively).

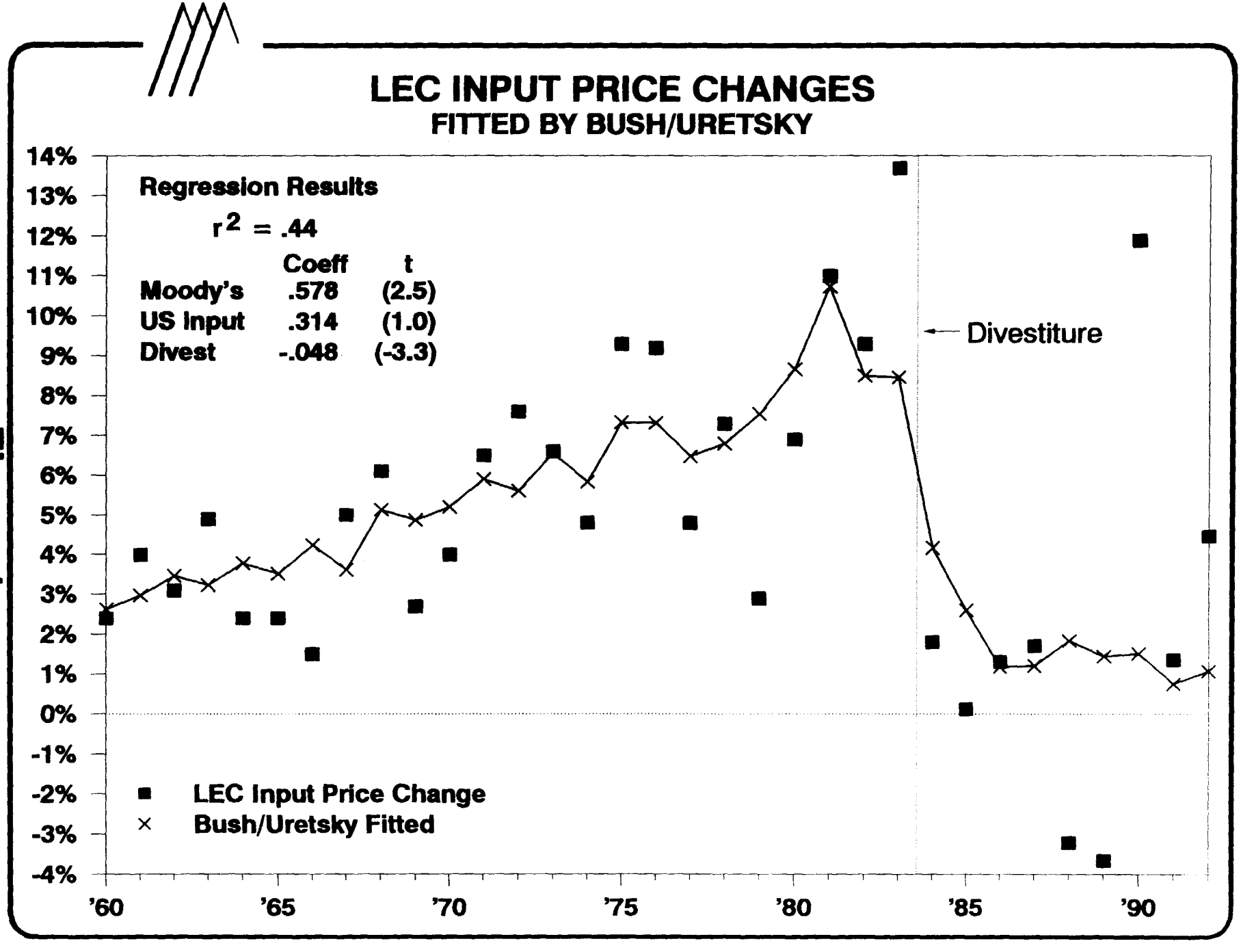
LEC INPUT PRICE CHANGES
FITTED BY BUSH/URETSKY
Regression Results
r2 = .44
Coeff t
Moody's .578 (2.5)
US Input .314 (1.0)
Divest -.048 (-3.3)
Divestiture
LEC Input Price Change
Bush/Uretsky Fitted
14%
13%
12%
11%
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
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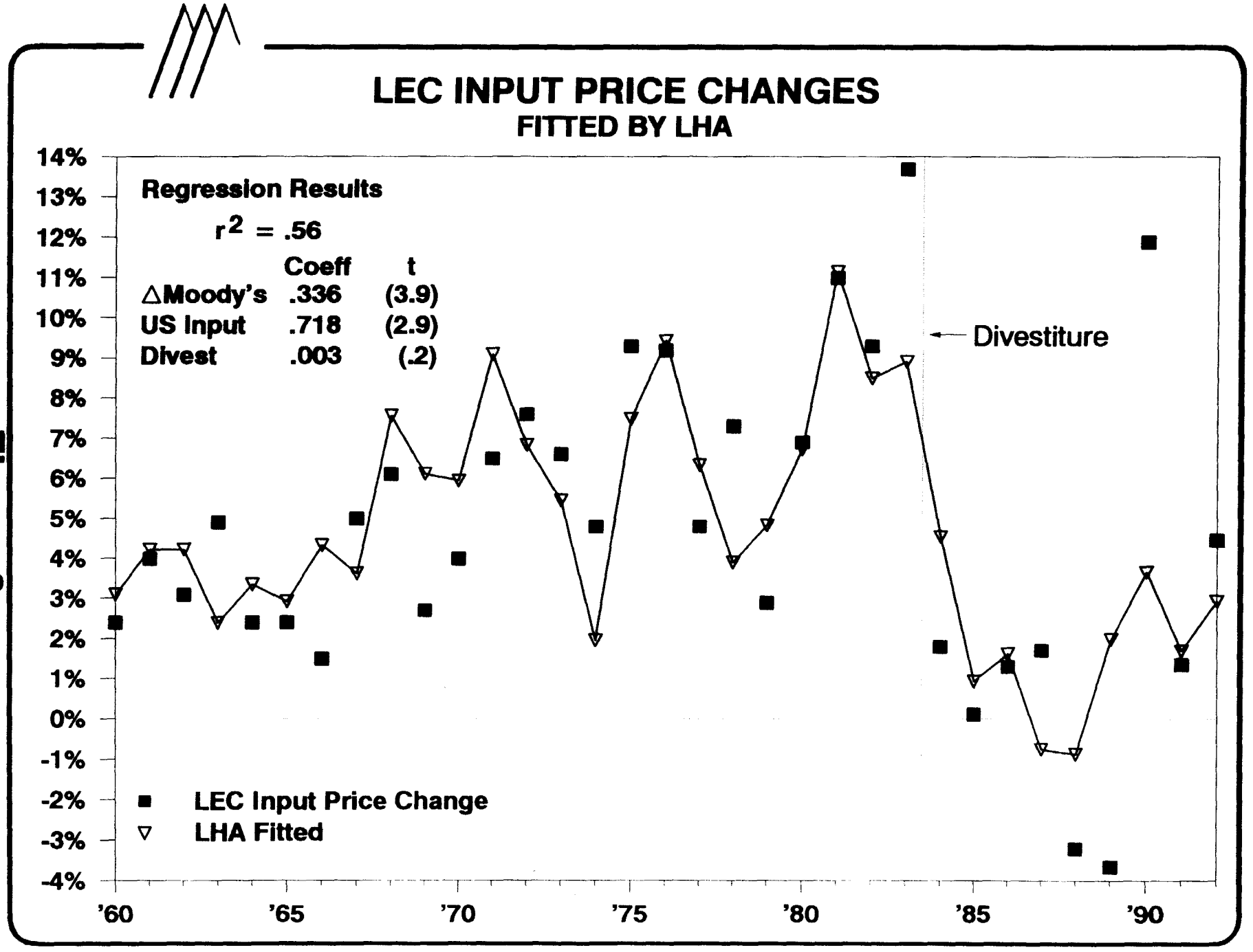
Figure 1


LEC INPUT PRICE CHANGES
FITTED BY LHA
Regression Results
r2 = .56
Coeff t
△Moody's .336 (3.9)
US Input .718 (2.9)
Divest .003 (.2)
Divestiture
LEC Input Price Change
LHA Fitted
14%
13%
12%
11%
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
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'75
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'85
'90

Figure 2